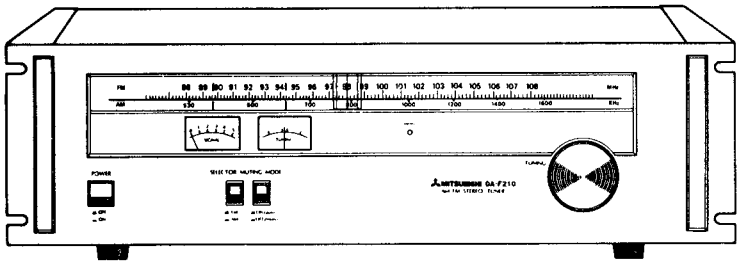
MITSUBISHI
AUDIO SYSTEMS

SERVICE MANUAL

AM/FM STEREO TUNER
MODEL DA-F210/DA-F210S



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MITSUBISHI ELECTRIC CORPORATION

SPECIFICATIONS

1-(1) FM TUNER SECTION (IHF)

Usable sensitivity (at 98 MHz)	
MONO	10.8 dBf (1.9 μV)
STEREO	23.1 dBf (7.8 μV)
50 dB quieting sensitivity (at 98 MHz)	
MONO	20.0 dBf (5.5 μV)
STEREO	40.0 dBf (50.0 μV)
Signal to noise ratio (at 98 MHz, 1 mV)	
MONO	78 dB
STEREO	72 dB
Frequency response	±3 dB from 30 Hz to 15 kHz
Total harmonic distortion (at 1 kHz, 100% modulation)	
MONO	0.2%
STEREO	0.3%
Capture ratio (at 98 MHz, 1 mV)	1.0 dB
Alternate channel selectivity (at 98 MHz)	60 dB
Spurious response ratio (at 98 MHz)	80 dB
Image response ratio (at 98 MHz)	60 dB
IF response ratio (at 98 MHz)	90 dB
AM suppression ratio	55 dB
Stereo separation	40 dB at 1 kHz, 35 dB at 10 kHz
Subcarrier product ratio	30 dB
Tuning range	87.5 MHz to 108 MHz

1-(2) FM TUNER SECTION (DIN)

Sensitivity (at 40 kHz deviation)	
MONO (S/N 26 dB)	1.3 μV
STEREO (S/N 46 dB)	32 μV
Image frequency rejection (at 98 MHz)	60 dB
IF rejection (at 98 MHz)	80 dB
Spurious rejection (at 98 MHz)	70 dB
AM rejection	50 dB
Selectivity (at 40 kHz deviation, ±300 kHz)	50 dB
Signal to noise ratio (at 40 kHz deviation)	
MONO	70 dB
STEREO	68 dB
Total harmonic distortion (at 1 kHz, 40 kHz deviation)	
MONO	0.2%
STEREO	0.5%
Stereo separation (at 1 kHz, 40 kHz deviation)	40 dB
Frequency response	±3 dB from 30 Hz to 15 kHz

2-(1) AM TUNER SECTION (IHF)

Usable sensitivity (bar antenna)	40 dB
Selectivity (at 1 kHz)	35 dB
Total harmonic distortion (±400 Hz, 90% modulation)	0.8%
Image response ratio (at 1 kHz)	50 dB
IF response ratio (at 1 kHz)	40 dB
Hum and noise (94 dB)	50 dB
Tuning range	525 kHz to 1605 kHz

2-(2) AM TUNER SECTION (DIN)

Sensitivity (bar antenna, at 30% modulation, S/N 26 dB)	300 μV/m
Signal to noise ratio (at 5 mV/m, 30% modulation)	50 dB
Selectivity (at ±9 kHz)	30 dB
Image frequency rejection (at 1 MHz)	50 dB
Total harmonic distortion (at 30% modulation)	0.8%

3. GENERAL

Output level/impedance	200 mV/5 k ohms
Power consumption	4 W
Dimensions (W x H x D)	DA-F210: 480 x 139 x 329 mm (18-7/8 x 5-1/2 x 12-13/16") DA-F210S: 424 x 139 x 319 mm (16-11/16 x 5-1/2 x 12-9/16")
Weight	DA-F210: 4.2 kg (9-1/4 lb) DA-F210S: 4.0 kg (8-4/5 lb)

Design and specifications are subject to change without notice for improvement.

FRONT PANEL TERMINOLOGY AND FUNCTIONS

1. SIGNAL (Signal Strength Meter)
This meter shows the most distortion-free position for receiving the FM signal. When locating FM broadcasts, first tune in the station with the SIGNAL meter. Then use this meter for fine tuning adjustments. When no FM signal is being received, the needle of this meter is in the center. As a station is tuned in, the needle will move either to the right or the left and then back to the center when the signal is tuned to its best position. This meter does not function for AM stations.

2. TUNING (FM Center Channel Turning Meter)
This meter shows the signal strength level of AM and FM broadcasts. For AM broadcasts, the best position for reception is obtained when the needle of this meter reaches its maximum deflection to the right. For FM broadcasts, the best position for reception is obtained when the needle of this meter reaches its maximum deflection to the right and the needle of the TUNING meter is centered.

3. DIAL MARKER
This marker indicates receiving FM or AM frequency.

4. DIAL SCALE
This scale indicates FM or AM frequencies.

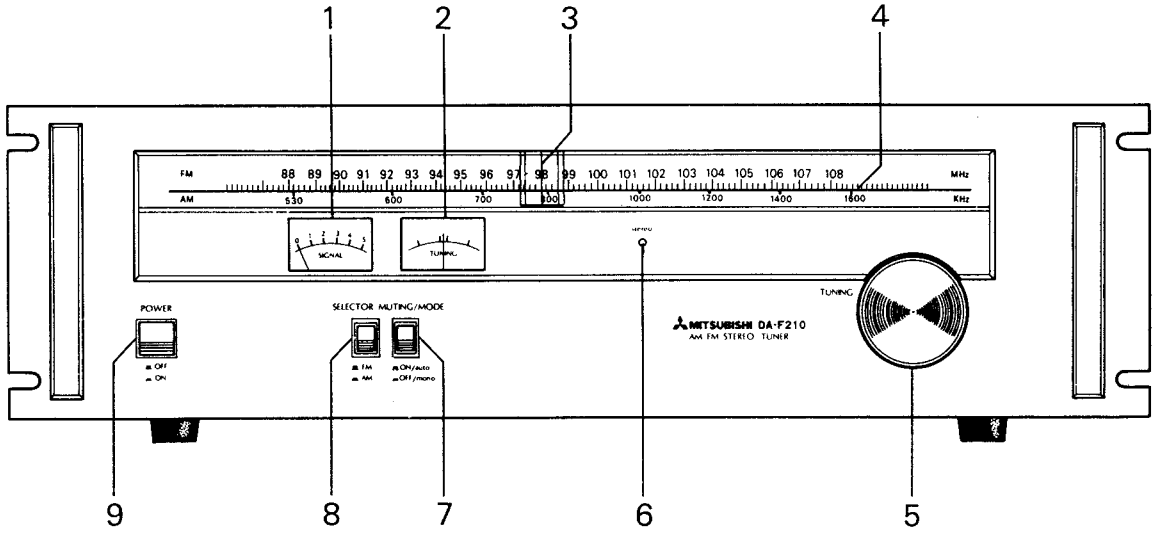
5. TUNING (Tuning Control)
This control is for selecting the desired station on AM or FM bands. Tune in the desired station by observing the position of SIGNAL meter and TUNING meter while rotating this control.

6. STEREO (Stereo Indicator)
This indicator lights up when a FM stereo broadcast is being received. If the MUTING/MODE switch is in the OFF/MONO position, this indicator will not light up even when a stereo station is tuned in.

7. MUTING/MODE (Muting/Mode Selection Switch)
This switch is for selecting the mode of FM reception you desire.

ON/AUTO For receiving a FM stereo broadcast. In this position, the interstation noise is eliminated while tuning.

F210 (WITH HANDLE)
F210S (WITHOUT HANDLE)
DIN antenna jack



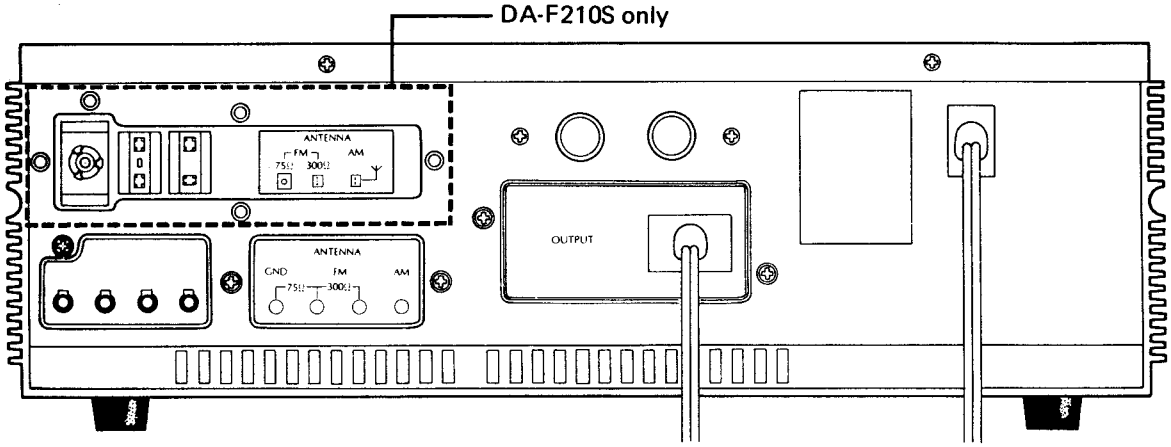
OFF/MONO For receving a monaural FM broadcast. In this position, the interstation noise is not eliminated while tuning, enabling weaker FM broadcasts to be tuned in. Stereo broadcasts are also received monaurally.

8. SELECTOR (Band Selection Switch)
This switch is for selecting FM or AM band reception.

FM For receiving FM broadcasts
AM For receiving AM broadcasts

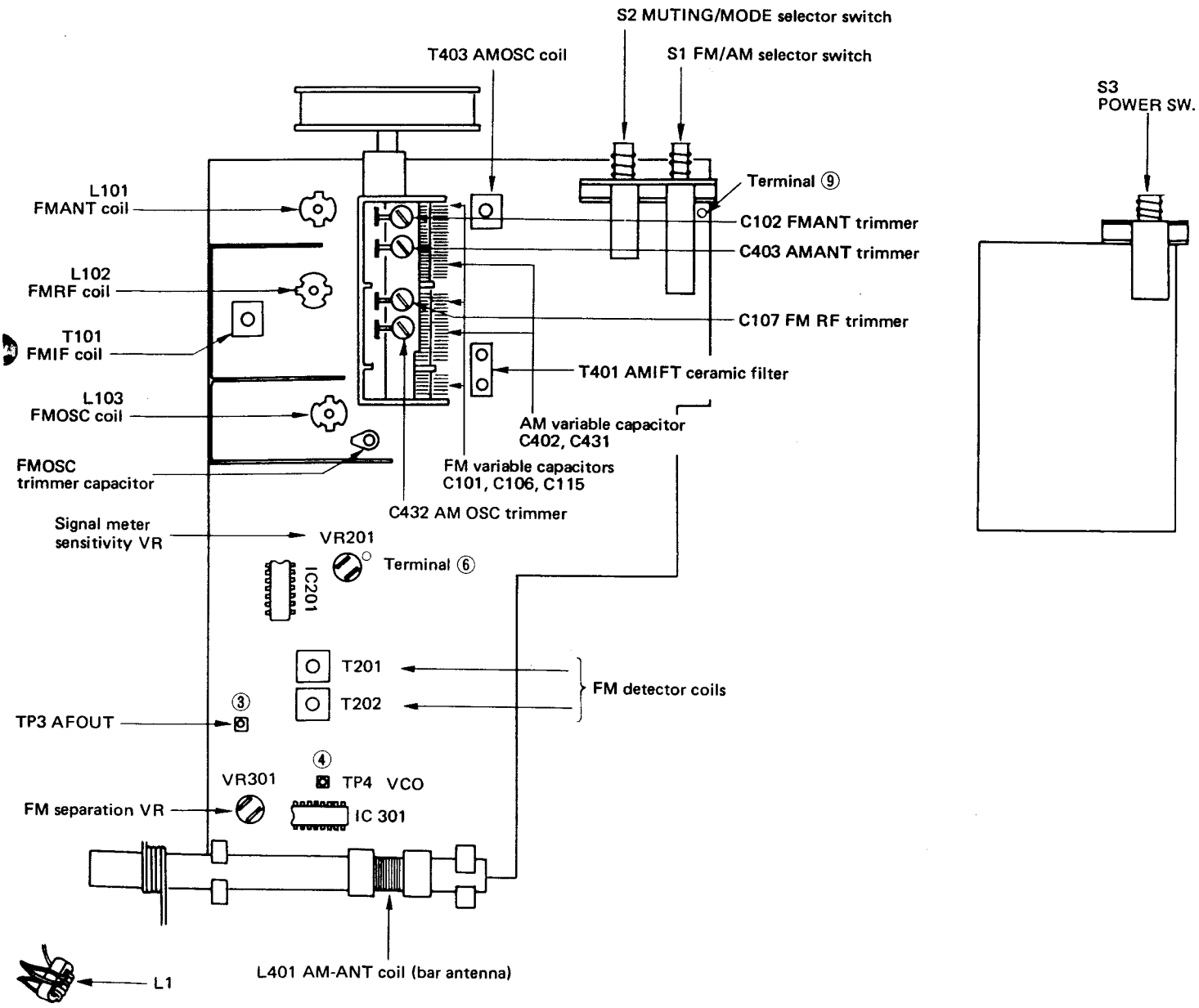
9. POWER (Power Switch)
This switch is for tuning this unit on and off. When in the ON position, the dial scale and meters are illuminated.

REAR PANEL



A.C. POWER CORD
This cord is plugged into the A.C. wall outlet.

PARTS PLACEMENT



ADJUSTMENTS

■ FM Adjustment

1. FM front end adjustment

(1) Connect the SG signal to the FM-ANT terminal and take out the output signal from TP③. Reduce the SG output as much as possible.

(2) Set the dial pointer to the far left, set the frequency of the SG signal to 87.5 MHz, and then adjust L103 to bring the output signal to its maximum.

(3) Now set the dial pointer to the far right, set the frequency of the SG signal to 109 MHz, and adjust C116 to bring the output signal to its maximum.

(4) Tune at 88 MHz, and adjust L101, L102 and T101 so that the output signal is brought to its maximum.

(5) Tune at 108 MHz again, and adjust C102 and C107 so that the output is brought to its maximum.

2. FM discriminator transformer adjustment

(1) With the model detuned, adjust T201 so that the tuning meter pointer is positioned at the center.

(2) Connect the SG signal to the FM-ANT terminal and apply a 98 MHz monaural 400 Hz, 100% modulation signal. Set the SG signal output to 65 dBf (60 dB), and connect the oscilloscope to terminal ⑨. Now adjust T202 to obtain the proper S curve.

(3) Connect a distortion meter to TP ③, apply an 85 dBf (80 dB) signal to the model, and adjust T202 and T101 so that the distortion is reduced to the minimum.

3. Signal meter adjustment

Apply a 75 dBf (70 dB) signal to the model, and adjust VR201 so that the signal meter pointer deflects to gradation 4 or 5.

4. FM MPX adjustment

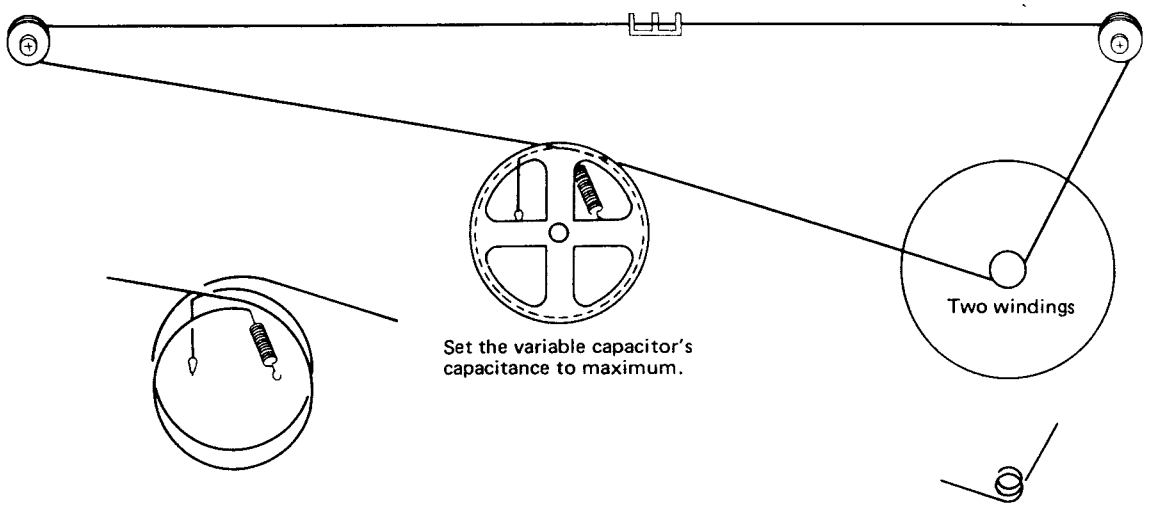
Connect a frequency counter (or oscilloscope) to TP ④, and adjust VR301 for a signal with a frequency of 19 kHz.

■ AM adjustment

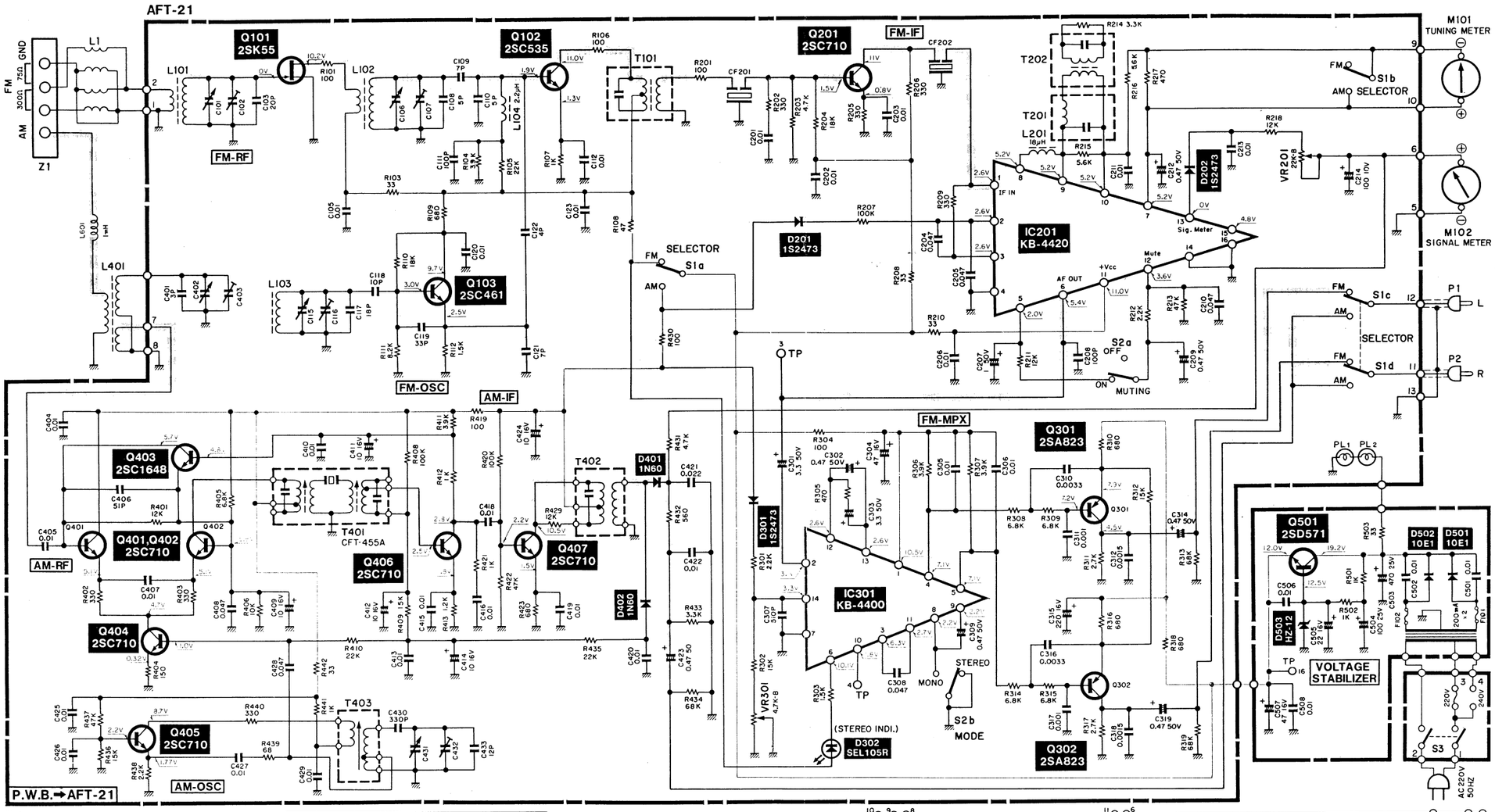
1. Set the SG signal frequency to 520 kHz, take out the output signal from terminal ⑥, set the dial pointer to the far left and adjust T403 for the maximum output.
2. Set the SG signal frequency to 1,650 kHz, set the dial pointer to the far right, and adjust C432 for the maximum output.
3. Set the SG signal frequency to 600 kHz, set the pointer to the same frequency, and adjust L401 for the maximum output.
4. Set the SG signal frequency to 1,400 kHz and set the pointer to the same frequency. Now adjust C403 for the maximum output.
5. Set the SG signal frequency to 1,000 kHz, tune the model and then adjust T401 for the maximum output.

* The above adjustments should preferably be performed with as low an input level as possible.

PLACEMENT OF THE DIAL THREAD

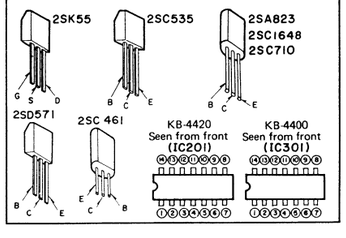


BASIC SCHEMATIC DIAGRAM

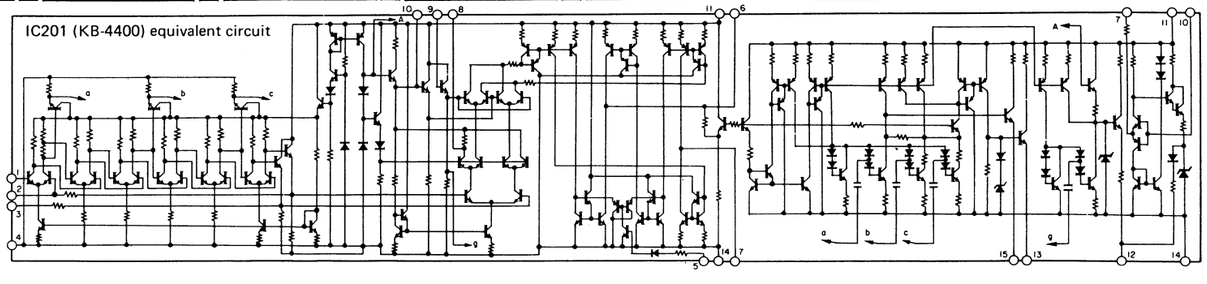


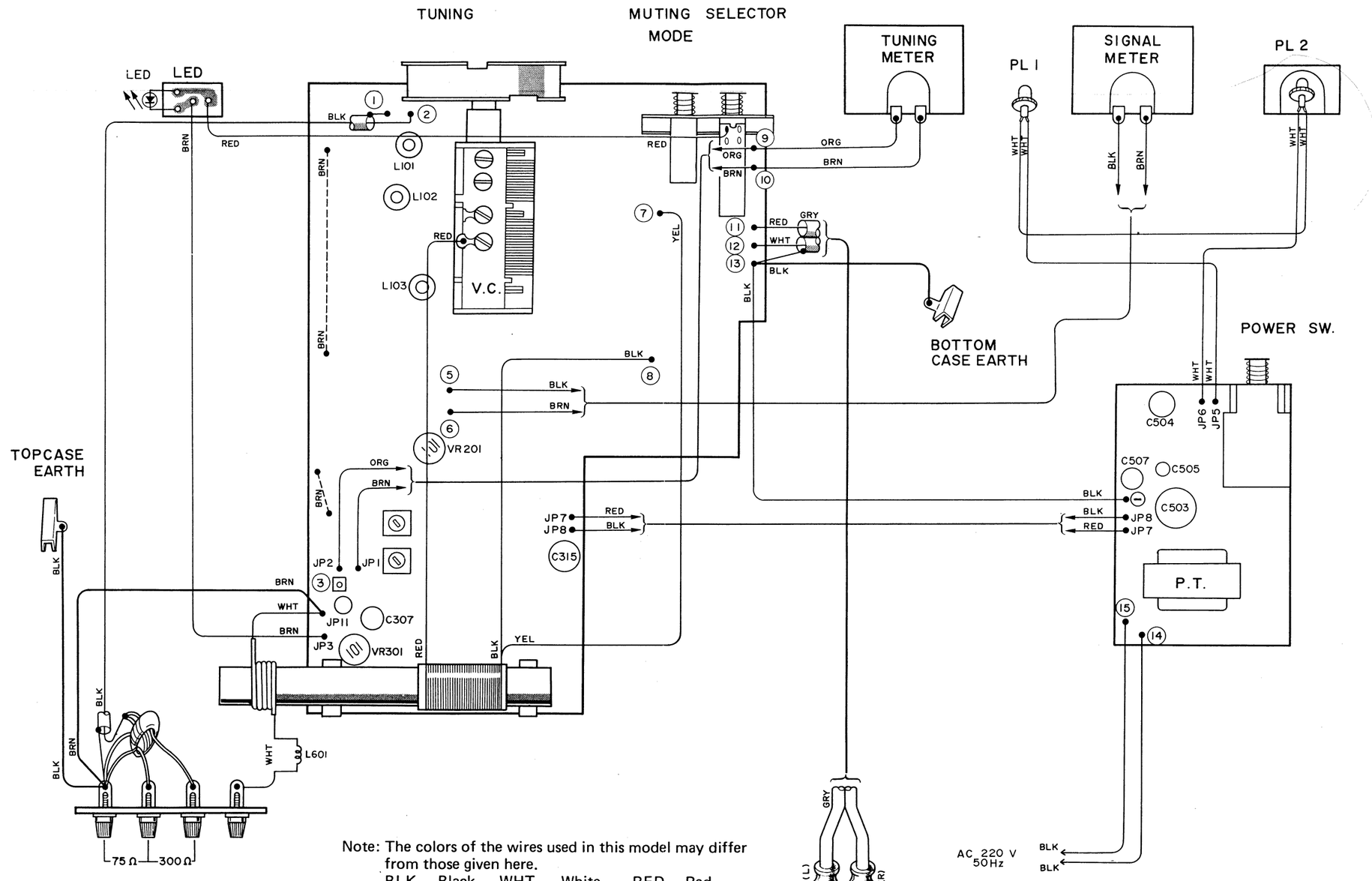
Notes:
1. S1a to S1d are AM/FM selector switches currently at the FM position.
2. S2a and S2b are MUTING and MODE switches, with the former currently set to MUTING ON and the latter to STEREO.
3. Capacitance and resistance values:
   1) C .. No symbol: μF 2) R .. No symbol: ohms
   Symbol: pF Symbol K: kohms
4. All the voltages are those values when no signals are being applied. (Use a tester with an internal resistance of 20 kohms/V.)
   The schematic shows the basic circuitry. All the constants are subject to change due to improvement, etc.
   Path of FM signal
   Path of AM signal

Connections of transistor and IC pins



IC201 (KB-4400) equivalent circuit





Note: The colors of the wires used in this model may differ from those given here.

BLK ... Black	WHT ... White	RED ... Red
ORG... Orange	BRN ... Brown	BLU ... Blue
YEL... Yellow	GRY ... Gray	GRN... Green
PPL ... Purple	PNK ... Pink	

SERVICE PARTS LIST

MODEL DA-F210

PART IDENTIFICATION	PART NO.	DESCRIPTION
Q101	M07152303	TRANSISTOR 2SK55
Q102	M04070303	TRANSISTOR 2SC535
Q103	M04066313	TRANSISTOR 2SC461
Q207,401,402,404~407	M04070304	TRANSISTOR 2SC710
Q301,302	M05104312	TRANSISTOR 2SA823
Q403	M05104310	TRANSISTOR 2SC1648
Q501	M07228303	TRANSISTOR 2SD571
D201,301	M07060320	DIODE IS2473
D302	M07228320	DIODE SEL105R
D401,402	M04097320	DIODE IN60
D501,502	M07228321	DIODE IOE1
D503	M04137320	DIODE HZ12
IC201	M07361343	IC-KB4420A
IC301	M07361344	IC-KB4400
L401	M07228540	COIL ANT
S3	M05113430	SW-PUSH
S1 (S2)	M07228451	SW-PUSH
	M05110472	FUSE 1A SEMKO
F101,102	M07327490	FUSE 200MA-SEMKO
T1	M07361549	TRANS POWER
M101	M07228260	METER (TUNING)
M102	M07228261	METER (SIGNAL)
PL1,2	M07361250	LAMP
	M07228210	KNOB (TUNING)
	M07361210	KNOB
	M07361211	KNOB
	M07215195	LEG